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# Food security, nutrition and health of food bank attendees in an English city: A cross-sectional study.

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## Abstract

Food banks in contemporary Britain are feeding record numbers of people. Little is known about attendees' level of food insecurity, background diet quality or health. We surveyed 112 food bank attendees. Over 50% had experienced food shortage with hunger on a weekly basis or more often. Obesity and mental health problems were prevalent in women. Diet quality was poor, with energy, protein, fibre, iron and calcium intakes inadequate, while saturated fat and sugars intake were disproportionate. Women had poorer diet quality than men. Such patterns may lead to ill health.

**Key words**: vulnerable adults, health, food insecurity, charitable food aid, diet, obesity

## Introduction

Growing numbers of people in contemporary Britain obtain emergency food aid through food banks [1]. Food banks are often run by charities and provide people with non-perishable food parcels designed to provide sustenance for a 3-day period. Eligibility is usually pre-established by the statutory care agencies (general practitioners, health visitors and social workers); these groups refer people to a local food bank using a voucher system. Users of food banks encompass a wide range of vulnerable people many of whom are of working age, including the newly unemployed and people with benefit sanctions and delays, and destitute asylum seekers [2].

In 2013 some 500,000 people were reliant on this form of emergency food aid [2], while 2014 figures from The Trussell Trust, which is the biggest food bank provider operating across the United Kingdom (UK), estimated that figure was 900,000 [1]. This spiralling level of food poverty has prompted an all-party parliamentary committee enquiry [3] .

The rise in British food banking is underpinned by ill-health, debt, low-pay, a failing benefit system and high food and utility prices [4,5], but little primary study has measured household food insecurity [6]. Food insecurity can embrace a gamut of circumstances from worrying about food, scrimping on food purchases, compromising quality and variety of food, experiencing hunger, missing meals to entire days without food. Studies of North American and Dutch food bank recipients have revealed high levels of food insecurity [7,8]. A recent analysis of European survey data [9] suggests that food insecurity has risen after the financial crisis of 2008, and particularly so in the UK.

Paradoxically food insecurity has been associated with high body mass; North American studies of the general population reveal that food-insecure women in particular have increased risk of obesity [10,11]. Studies of people using food pantries and studies of homeless people have also noted a substantial prevalence of overweight and obesity [12,13]. These studies have not assessed dietary

energy intake, but there are indications of reliance on palatable, energy-dense foods. North American studies have noted minimal fruit and vegetable consumption [14], as well as low wholegrain and milk intakes, within an overall unhealthy dietary pattern [7]. Such dietary patterns may increase risk of chronic disease, and are congruent with the greater prevalence of diabetes and obesity in people who are food insecure [10].

We are not aware of studies that have scrutinised the background diet of British food bank recipients. The aim of this study was to systematically assess this group's household food security status and measure nutrient intake during food crisis.

## Methods

The design was a researcher-administered, cross-sectional survey. The survey had ethical approval from the University School of Medicine. A purposive sample of food bank attendees was recruited between May and August 2014 from three food banks in an English city. Inclusion criteria were adults above the age of 18 years who had spoken English language conducive to participation. Participant approach and recruitment varied slightly at each food bank. Generally, food bank staff members greeted attendees and discussed their voucher and food parcel with them. One of the research team then informally approached attendees and introduced the study. People who showed interest were given a participant information sheet to read or the researcher explained the information sheet. People willing to participate gave written consent. A £10 supermarket voucher was offered to participants.

The multiple-pass 24-hour recall technique was used to estimate the dietary intake of participants. Each participant was interviewed at the food bank on one occasion. The participant was asked to recall their previous day's food and drink consumption, using standardised multiple-pass 24-hour

recall interview methods; a photographic food portion atlas was used for estimations of portion size [15].

Participants were then asked to respond to a set of 23 interviewer-administered short-answer questions, which were of both open and closed format (see appendix 1). These questions covered general demographic information, self-reported body weight and height, factors affecting food access, desired changes in diet, and food insecurity [16].

Food consumption data from the 24-hour recall interviews were inputted to a nutrient software package (NETWISP 4.0; Tinuviel Software, England). Daily intake of energy, macronutrients, iron, calcium and sodium were calculated for each participant. These data along with questionnaire information were entered into SPSS (version 22.0). Body Mass Index (BMI) was calculated from weight and height. Descriptive statistics were used to describe the study sample. Difference between median intakes of energy and nutrients were compared with the UK recommendations [17] using the One-Sample Wilcoxon Signed Rank test. The proportion of participants meeting recommendations was also calculated. Chi-squared tests were employed to test for association.

## Results

In total, 112 people participated in the 24-hour recall and survey. This sample had a greater proportion of men (58.9%; n=66) than women (41.1%; n=46). The age range of the sample was 18 to 72 years, with a mean age of 40.2 (sd=13.6) years. The ethnic composition of the sample was predominantly White British (83.9% n=94), with small numbers of other ethnicities: 4.5% African (n=5), 8.1% Asian (n=9), 1.8% European (n=2), and 1.8% Caribbean (n=2). Asylum seekers comprised 9.0% (n=10) of the sample. The majority of people were single (63.4%; n=71), with the remainder married or co-habiting (23.2%; n=26), widowed (0.9%; n=1) and separated or divorce (11.6%; n=13). Overall, 51 participants (45.5%) lived in a single-person household. Most

participants (n=101; 90%) reported that they were unemployed. Of those that were in work, one respondent said that they had a full-time job, three respondents were working part-time and two respondents worked occasionally or seasonally. The remaining participants were retired (n=3) or did not give a response (n=2).

The numbers of participants reporting various health conditions and BMI distributions are provided in Table 1. There were gender differences in the proportions classified in categories of relative body weight ($p<0.001$); 41% of women were categorised as obese or morbidly obese compared to only 9% of men. Women also reported a greater prevalence of respiratory problems than men (19.6% versus 6.1%). A total of 106 people responded to a question on body weight change over the previous year: 21 (18.8%) reported a weight increase, while 52 (46.4%) reported weight loss. Some 60% of the sample reported a chronic health condition, with the most common report being related to mental health (26%). Other chronic health conditions were diabetes and conditions of the musculoskeletal, respiratory and cardiovascular systems. There was no evidence of a relationship between BMI and reported mental health problems.

The figures for food security are shown in Table 2. Over half of participants reported a high level of food insecurity due to lack of money on *at least* a weekly basis: skipping meals or reducing portion sizes (58%), eating less than they felt they should (59%), and feeling hungry but not eating (57%). The corresponding figures for never having experienced these levels of food insecurity were 19%, 18% and 26%. Less than a quarter of the sample (24.1%) reported that this was their first visit to a food bank. A total of 80 participants further responded to the question on frequency of use of a food bank in the last month: 6.3% of the sample (n=5) reported no previous use, 20.0% (n=16) reported using the food bank once, 20% (n=16) reported using the food bank twice, while 53.8% (n=43) reported food bank usage of three times or more often.

Around half of participants reported that attendance at a food bank was due to problems with benefits (54%) or low income (46%). Information on barriers to consuming good quality food or having a variety of food was also gathered. The most frequent response was shortage of money (n=103, 92.0%) followed by transport problems (n=27, 24.1%). Participants were also asked about changes they would like to make to their diet. A substantial minority of people (n=27, 24.1%) did not wish to make any dietary change. The two most common aspirations were to eat more fruit and vegetables (n=32, 28.6%) and to eat healthier in general (n=30, 26.8%). A minority of people (15; 13.4%) reported a desire to eat more overall, while only 6 (5.4%) reported wanting to lose weight.

Nutrient intakes of participants are given in Table 3. Both men and women had a significantly lower energy intake ($P<0.001$) than the theoretical requirement. Saturated fat and free sugars made significantly greater contributions to total energy intake ($P<0.001$) than recommended. Dietary fibre intake was significantly lower than recommended ($P<0.001$), as were calcium ($P=0.049$) and iron intakes (men $P=0.007$, women $P<0.001$). Only four participants recorded alcohol consumption. It should be noted that one participant reported no food consumption (water only). Between 40% and 90% of the sample had a lower intake of energy, protein, fibre, calcium and iron than recommended, while energy from fat, saturated fat and sugars was greater than recommended in between 55% and 60% of participants. Recorded sodium intakes were excessive in just over half of men.

## Discussion

This study set out to address the gap in the evidence as to food bank users' experience of food insecurity and background dietary quality. It has unveiled that food bank users have a nutritionally inadequate diet while in food crisis (the day prior to accessing emergency food aid), and missing meals and experiencing hunger happens weekly or more for most. The severe level of food insecurity is confirmed by the pattern of food bank use – over 50% of participants had visited a

food bank 3 or more times in the past month. Acute food shortage was most marked for dietary adequacy of fibre, calcium and iron. Importantly, intake of protein was also low, with over 40% of people falling below the threshold for adequacy. These nutrient shortfalls are unsurprising in the face of a marked dietary energy deficit – energy intake was 800 Kcal below theoretical energy requirements. At this level of energy restriction achieving adequate micronutrient intake is challenging. A dependence on calorie-dense food was seen in nutrient intakes weighted towards fat and sugars as energy sources, albeit under the umbrella of energy restriction. Nevertheless food bank users had aspirations to eat healthier food, primarily through greater consumption of fruit and vegetables.

While the acute effect of food shortage may be a diminished intake of energy and nutrients, predisposing towards malnutrition, dietary overconsumption was in evidence in our dataset with substantial numbers of women classified as overweight and obese. Clearly the negative energy balance we documented during a period of food shortage had been offset by overconsumption at other times. However, compensatory overeating was not universal, as 7% of participants were classified as underweight and recent weight loss was reported by nearly 50%. Other health problems were also prevalent, with over a third of women reporting poor mental health.

Finally, less than a quarter of food bank users in this study reported they were accessing the food bank for the first time. There seems to be a large cohort of users who habitually endure food shortage, for whom access to emergency food aid is both routine and critical. Such dependence arose from straitened financial circumstances, particularly because of issues with social security benefits.

Like most dietary studies, nutrient intake estimates were reliant on self-reporting of food consumption, which is open to underreporting. This bias may be exacerbated in this population, as

low food consumption may be perceived to vindicate receipt of charitable food, albeit participants were advised that participation had no bearing on entitlement. Other social response biases may be acting, not least an influence of high relative body weight. Furthermore, a single day of recall does not provide a measure of habitual intake. Our estimates of intake of energy and nutrients reflect the trough of dire food shortage. That said, the high frequency rate of severe food insecurity (encompassing both food shortage and hunger) indicates that such troughs are customary. Interpretation of the prevalence figures for BMI must consider that these were based on self-report of weight and height. In food insecure populations such measures are known to be biased towards under-reporting of weight for height [18]. It is likely that prevalence of overweight and obesity exceeds 40%. The sample was a small, convenience sample comprising largely of single, White, British city-dwellers and having a high proportion of men. These results must be interpreted in the context of a preliminary study and extrapolation to the wider national context has to be tentative. Even with this caveat, the study provides valuable primary data on the level of food insecurity experienced by people turning to food banks, and its acute and negative impact on dietary quality.

Comparative British literature on the extent of under-nutrition among vulnerable people is scarce, but nutrient intakes parallel those of a 2012 study of homeless people, which described low intakes of energy, protein and iron, and a reliance on fat and sugar as energy sources [15]. A qualitative study of Scottish food bank users noted that meat consumption was compromised during food crisis [5],

The current study used three items to assess food insecurity. These items were taken from a 10-item screening tool used in a 2003-2005 national government survey of low-income families (ref). The shortening of the original screening tool was necessary to reduce survey time and in addition the original items were rephrased to measure food insecurity experience in an acute setting i.e. over the previous month. These three items are similar to the 8-item Food Security Inexperience Scale Food In Security Experience scale has been used I While there is not an official government

definition of food insecurity used in the UK, this definition is drawn from guidance on measuring food insecurity in the USA and was used for the UK's Low Income Diet and Nutrition Survey, 2007

Nearly 60% of participants surveyed were experiencing severe food insecurity (being hungry and not being able to eat) on a weekly basis or more often. These figures are set against a 33% rise in hospital admissions for malnutrition in England between 2010/11 and 2014/2015, while local hospitals record a doubling of cases in a similar time period; there were 92 cases in 2014, which is the year this study was conducted [19]. The convergence of food insecurity with obesity in women, as opposed to men, has been shown in North American surveys [20,21] as well as in a secondary analysis of the Health Survey of England [22] showed an relationship between low household income and obesity in women only. The obesity issue has not surfaced in the UK food bank literature, but our data indicate a substantially greater prevalence of obesity in women than the English national average of 24% (2013 figures) [23]. It is likely our obesity prevalence rate estimates are conservative.

The high prevalence of mental health problems concurs with case studies of UK food bank users [4,24] and North American surveys of food pantry users [12]. Depression and poor mental health have been linked to risk of obesity [25] in cross-sectional study designs, although the relationship may be bi-directional. This relationship was not corroborated in this study, but sample size was limited.

Cycles of 'plenty and want' are a feature of poverty-driven food insecurity. Such cycles are known to lead to dependence on energy-dense foods of low nutritional quality that are affordable, appetising and ubiquitous [26]. Although some food bank users recognised that their diets lacked fruit and vegetables, the rise in British food prices since 2008 have been marked for these foodstuffs, while in contrast foods and drinks high in fat and sugar have been price resilient [27]. The economic vulnerability of food insecure populations means that provision of culinary complex

meals, which require substantial larder stocks and are centred on expensive meat and vegetables is impossible. Food policy measures using economic instruments to regulate food prices and encourage a shift in eating pattern may be necessary [28].

Fluctuation in the household food supply seems to result in a psychological drive to overeat in women; emotional and binge eating after periods of food deprivation has been documented [29] and women with children and those experiencing depression seem to more susceptible to such behavioural patterns [21]. A desire for food calories in the face of financial insecurity seems to overwhelm other aspects of food choice. Healthy eating campaigns are likely to be seen as peripheral by people who are focused on getting enough food energy to survive.

With the growing reliance on food banks, and if these results are substantiated, health professionals can expect to see an increase in the number of patients presenting with ill health related to malnutrition. These may include iron deficiency anaemia, uncontrolled diabetes, and hypertension, as well as excess weight. There is also potential to improve dietary adequacy through improvements in the food distributed at food banks. Clearly, provision of foods rich in protein, iron, calcium and fibre is necessary, and procurement policies could be more prescriptive. Some North American and Canadian food banks have introduced policies to address poor dietary patterns of their clients [26,30]. There is some evidence that recipients of charitable food are open to dietary change and value such initiatives [31,32].

Further research to confirm these findings is needed. Ideally it would incorporate a less subjective method of dietary assessment, such as a photographic record, have physical and biochemical measures of nutritional status and have a wider geographical sampling frame.

People using food banks experience substantial and recurring food insecurity. This insecurity impacts negatively on diet quality with compromised intakes of energy, protein, fibre, calcium and

iron and a reliance on fat and sugars. Such patterns may lead to ill health. Women using food banks have a high prevalence of obesity and mental health problems.

**Table 1: Relative body weight and chronic illness profile of sample (n; percentage in parentheses; base = 103)**

| Characteristic | | Men | Women | Total | Tests |
|---|---|---|---|---|---|
| BMI category* (kg/m$^2$) | Underweight (<18.5) | 3 (4.7%) | 4 (10.3%) | 7 (6.8) | $\chi^2(4)=22.0$ $p<0.001$ |
| | Healthy weight (18.5-24.9) | 37 (57.8%) | 17 (43.6%) | 54 (52.4) | |
| | Overweight (25-29.9) | 18 (28.1%) | 2 (5.1%) | 20 (19.4) | |
| | Obese (30-39.9) | 6 (9.4%) | 11 (28.2%) | 17 (16.5) | |
| | Morbidly obese (>40) | 0 (0.0%) | 5 (12.8%) | 5 (4.9) | |
| Chronic illness or disability** | None | 29 (43.9%) | 14 (30.4) | 41 (38.4) | $X^2(1)=2.1$, $p=0.171$ |
| | Mental health | 12 (18.2%) | 17 (37.0%) | 29 (25.9) | $X^2(1)=5.0$, $p=0.030$ |
| | Diabetes | 5 (7.6%) | 3 (6.5%) | 8 (7.1) | $X^2(1)=0.05$, $p=1.0$ |
| | Cardiovascular | 6 (9.1%) | 3 (6.5%) | 9 (8) | $X^2(1)=0.2$, $p=0.735$ |
| | Musculoskeletal | 10 (15.2%) | 6 (13.0%) | 18 (14.3) | $X^2(1)=0.1$, $p=0.792$ |
| | Respiratory | 4 (6.1%) | 9 (19.6%) | 13 (11.6) | $X^2(1)=4.8$, $p=0.037$ |
| | Other | 5 (7.6%) | 5 (10.9%) | 10 (8.9) | $X^2(1)=0.4$, $p=0.738$ |

**Table 2: Frequency of food shortage experiences (n; percentage in parentheses; base = 112)**

| Food shortage indicator | Never | Once or twice per month | Weekly | More than once a week |
|---|---|---|---|---|
| Skipped meals and/or reduced size of meal | 21 (19) | 26 (23) | 24 (21) | 41 (37) |
| Eaten less than felt should | 20 (18) | 26 (23) | 24 (21) | 42 (38) |
| Hungry but didn't eat | 29 (26) | 24 (22) | 23 (21) | 34(32) |

## Table 3: Median nutrient intakes (Inter-Quartile Range) compared to UK Dietary Reference Values (base = 112)

| Nutrient | | DRV | Median intake (IQR) | Median difference from DRV | p-value ‡ | % outside DRV |
|---|---|---|---|---|---|---|
| Energy (kcal/d) | Men | 2603[1] | 1775 (1235-2723) | -996 | <0.001 | 71.2 |
| | Women | 2078[1] | 1201 (719-1801) | -972 | <0.001 | 89.1 |
| Protein (g/day) | Men | 55[2] | 69 (38 - 113) | 13 | 0.003 | 40.9 |
| | Women | 45[2] | 36 (18-65) | -9 | 0.650 | 54.3 |
| Carbohydrate (% total energy) | | 50[3] | 53 (43-60) | 3 | 0.135 | 44.1 |
| Total fat (% total energy) | | <33[3] | 35 (28-41) | 2 | 0.092 | 56.8 |
| Saturated fat (% total energy) | | <10[3] | 13 (9-18) | 3 | <0.001 | 71.2 |
| Free Sugars (% energy) | | <5%[4] | 12 (15-17) | 7 | <0.001 | 86.6 |
| Alcohol (% energy) | | <5[3] | 0 (0-0) | -5 | <0.001 | 0 |
| Fibre (g/day) | | 30[5] | 13 (7-24) | -17 | <0.001 | 83.0 |
| Sodium (mg/day) | | <2400[3] | 2151 (1307-3747) | -249 | 0.567 | 43.8 |
| Calcium (mg/day) | | 700[2] | 553 (314-875) | -148 | 0.049 | 61.6 |
| Iron (mg/day) | Men | 8.7[2] | 10.7 (6.3-15.4) | 2.0 | 0.007 | 39.4 |
| | Women | 14.8[2] | 5.8 (2.8-8.5) | -9.0 | <0.001 | 93.5 |

[1] Estimated Average Requirement [20] ; [2] Reference Nutrient Intake [20]; [3] Population Average [20]; [4] Reference Value [20]; [5]Association of Official Agricultural Chemists analysis; reference value [20] ‡ One-sample Ranked Wilcoxon Test

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